



CALIFORNIA STATE
UNIVERSITY
E A S T B A Y

INDOOR AIR QUALITY PROGRAM

(Adopted from California State University Office of the Chancellor's Sample IAQ Program)

TABLE OF CONTENTS

	<u>Page</u>
1.0 REGULATORY AUTHORITY	3
2.0 POLICY	3
3.0 PURPOSE	3
4.0 SCOPE	3
5.0 RESPONSIBILITIES	4
5.1 Department of Environmental Health and Safety	4
5.2 Department of Facilities and Management	4
5.3 Facilities Management and Planning	5
6.0 SOURCES AND SOURCE MITIGATION	5
6.1 Chemical Agents	5
6.2 Biological Agents	5-6
6.3 Physical Agents	6
7.0 RESPONSE AND MITIGATION PROCEDURES	6
7.1 Odors and Acute Complaints	6-7
7.2 Chronic Unsatisfactory Conditions	7-8
8.0 INDIVIDUAL PROGRAMS	8

1.0 REGULATORY AUTHORITY

California Code of Regulations, Title 8 sections 332.2, 332.3, 3203, 3362, 5141 through 5143, 5155, and 14301. This regulation provides guidelines for the protection of employees and for addressing employee related concerns to indoor air quality (IAQ).

2.0 PURPOSE

The purpose of this program is to establish a uniform set of guidelines for maintaining the quality of indoor air in all campus buildings. Through the collaborative efforts of Environmental Health and Safety, Facilities Management, and Human Resources, indoor air quality shall be maintained through preventative and responsive measures. Preventive approaches include periodic inspections, preventive maintenance, and plan review. Responsive approaches shall include a mechanism for complaint response, analytical monitoring and implementation of corrective actions. This program also designates departmental responsibility for ensuring the completion of programmatic elements and will incorporate other programs that concern specific IAQ issues.

3.0 SCOPE

This program shall include all CSU East Bay structures, including leased structures, and apply to all CSU East Bay employees. Response and improvement duties of this program rest with Environmental Health and Safety and Facilities Management. However, it is the responsibility of all employees to report IAQ deficiencies and complaints to their supervisor or Environmental Health and Safety.

4.0 RESPONSIBILITIES

4.1 Department of Environmental Health and Safety

- 4.1.1 Develop and maintain the campus Indoor Air Quality program. Make copies of the written program available to affected departments.
- 4.1.2 Provide assistance to individual departments concerning implementation of the program.
- 4.1.3 Respond to complaints concerning the quality of indoor air. Coordinate analytical testing and monitoring of indoor air if warranted by conditions.
- 4.1.4 Maintain record of employee/occupant complaints related to indoor air quality.

- 4.1.5 Coordinate mitigation efforts of conditions which may impact indoor air quality.

4.2 Department of Facilities Management

- 4.2.1 Maintain and operate HVAC system to design specifications.
- 4.2.2 Conduct routine inspections and maintenance of HVAC system. Retain inspection and maintenance records (HVAC testing, balancing, adjustment water treatment logs, etc).
- 4.2.3 Provide response to indoor air quality complaints in conjunction with Environmental Health and Safety. Assist with any remedial action if necessary.
- 4.2.4 Provide 100% outside air in the event of indoor pesticide fumigation, carpet installation, or material release.
- 4.2.5 Coordinate painting and/or remodeling projects and pesticide applications to minimize impact on IAQ.
- 4.2.6 Ensure all new and remodeled locations are provided with adequate ventilation.
- 4.2.7 Identify and inform specific campus departments of projects which may impact indoor air quality.

5.0 SOURCES AND SOURCE MITIGATION

5.1 Chemical Agents

5.1.1 Sources

Chemical agents are chiefly responsible for contaminating indoor air. These chemicals may be introduced into the indoor environment by a variety of ways. Some examples are: volatile contents found in newer office furniture and carpet, entrainment of an outdoor source via the HVAC system, and an indoor chemical release. With the exception of chemical spills, exposures in office settings are far below enforceable concentration limits set forth by the California Occupational Safety and Health Administration (Cal/OSHA). However, small concentrations may provoke reactions in hypersensitive individuals.

5.1.2 Source Mitigation

Mitigation of chemical agents may include substitution, source removal, and accelerated off-gassing. Common office products which generate volatile compounds may be substituted for water based or low emission

products. For instance, interior paints are now available that are water based and emit very low VOCs. If possible, source removal would ensure the improvement of indoor air quality. Source removal is required in the event of a spill or release. Office furnishings and carpet should be off-gassed out-of-doors prior to installation and placement to reduce the concentration of off-gassed products after installation. Off-gas time is dependent on the size and type of furnishing. Once carpet is installed, 100% outside air supplied by the affected building's HVAC system should be used to remove remaining VOCs.

5.2 Biological Agents

5.2.1 Sources

Biological agents can create a complex mixture of indoor air pollutants. The scope of biological agents includes: viruses, bacteria, fungi, protozoa, arthropods, and mammals. Biological agents in indoor air are known to cause four types of human disease: infections, where living organisms penetrate and grow in human tissue (e.g., Legionnaires' disease); allergic or hypersensitivity diseases (e.g., hay fever, asthma); toxicoses (e.g., endotoxins) and irritant effects from compounds released from biological growth.

5.2.2 Source Mitigation

Humid environments and condensation support the growth of biological agents. Therefore, materials subjected to floods or leaks shall be removed, dried or disinfected as soon as possible. The HVAC system and components will be routinely inspected for biological growth.

5.3 Physical Agents

5.3.1 Sources

Physical agents such as humidity, noise, vibration and temperature play small but important roles in indoor air quality. For example, dry environments exacerbate respiratory ailments and cause eye irritation, nosebleeds and dry throat. Exposure to mechanical vibration can lead to headaches and fatigue. While rare in office environments, excessive noise exposures are related to hearing loss, headache and mental fatigue.

6.0 RESPONSE AND MITIGATION PROCEDURES

6.1 Odors and Acute Complaints

6.1.1 Odors are caused by a source significant enough to briefly overwhelm a building's HVAC system. In some cases, odors are related to maintenance or construction activities. Once an employee notices a foreign odor, the employee should immediately report the problem to their supervisor or

Environmental Health and Safety (EHS) for response and logging. EHS will conduct an evaluation of the area. Since the sources vary and are seldom persistent, the main focus of the investigation will be on unusual events or new sources that have been introduced into the building.

- 6.1.2 Odors are commonly associated to singular events and require the exhausting capabilities of the HVAC system to perform properly. In most cases, the normal exhaust capability of the HVAC system has dissipated the odor before an investigation could be performed.
- 6.1.3 Acute conditions usually diminish over a short period of time and stem from sources such as new office furniture, new carpets, or other recently manufactured equipment introduced into an office. Materials used to manufacture these products contain numerous VOC's that produce the effects listed in Table 6.1 upon mild exposure. These complaints should be forwarded to EHS.

6.2 Chronic Unsatisfactory Conditions

- 6.2.1 Chronic unsatisfactory conditions are caused by a persistent source present in the building which doesn't diminish over time. In most cases, chronic unsatisfactory conditions are biologically related since concentration thresholds are caused by bio-amplification.
- 6.2.2 Sources which cause chronic mild symptoms related to the occupancy of a building are far more difficult to assess and require a complex investigative approach. Response to complaints of this nature will include a thorough inspection of the area and HVAC system. If this inspection does not yield obvious sources, EHS will distribute a questionnaire (Appendix C) to better assess symptom and event similarities. If trends are observed, a systematic evaluation of the indoor environment will be undertaken.
- 6.2.3 Chemical analyses of indoor air. Through real-time monitoring or OSHA/NIOSH sampling techniques, the identification and concentration of contaminants are determined. If sampling/monitoring results indicate contaminant concentrations exceed their respective ACGIH TLV or OSHA action limit, the contaminant source shall be removed from the affected area if possible and decontaminated by various means. If the source cannot be removed, efforts to contain or isolate the source will be undertaken.
- 6.2.4 In addition to biological and chemical assessments, physical assessments will also be conducted. Monitoring of temperature and humidity will round out the systemic approach to solving an IAQ issue. Ideally, relative humidity between 50% - 60% shall be maintained throughout the course of the workday. Dry or humid air may respectively lead to upper respiratory

irritation and microbiological growth. Adjustments shall be made to HVAC system if humidity monitoring results are not within the previously described range.

Document History

Document Revision:	Date	Prepared by:	Reviewed by:
New Document	unknown	CSU CO	unknown
No revisions	May 15, 2012	CSU CO	Donna Placzek

APPENDIX A

Examples of typical indoor air contaminants and their sources

Table 6.1

<u>Contaminant</u>	<u>Health Effects</u>	<u>Sources</u>
Carbon Monoxide	Nausea, headaches, visual disturbances, brain damage, angina	Automobile exhaust; improperly vented stoves, hot water heaters, and furnaces.
Formaldehyde	Mucous membrane irritation, fatigue, skin rash, and cancer in high exposures.	Particle board; plywood; adhesives in office furnishings and carpets; and tobacco smoke
Ozone	Upper respiratory irritation; dry eyes	Copiers; laser printers; air ionizers
Organic Vapors	Upper respiratory irritation; fatigue and nausea; long term exposures result in liver and kidney damage.	Paints, solvents, disinfectants and plastics
Asbestos	Asbestosis (lung tissue damage); mesothelioma (cancer of peritoneal lining); lung cancer.	Insulation; ceiling and floor tiles
Dusts	Upper respiratory irritation; dry throat; rhinitis.	Various
Carbon Dioxide	Fatigue and malaise; shortness of breath	Bioeffluents; poor HVAC operation.

APPENDIX B
Contaminant Source and PEL

Contaminant	Sources	Permissible Exposure Limit (PEL)
Carbon Monoxide	Automobile exhaust; improperly vented stoves, hot water heaters, and furnaces.	OSHA 8 hr. - 35 ppm OSHA ceiling limit - 200 ppm
Formaldehyde	Particle board; plywood; adhesives in office furnishings and carpets; and tobacco smoke	OSHA 8 hr. - 0.75 ppm OSHA 15 min - 2 ppm
Ozone	Copiers; laser printers; air ionizers	OSHA 8 hr. - 0.1 ppm OSHA 15 min. - 0.3 ppm
Organic Vapors	Paints, solvents, disinfectants and plastics	OSHA 8 hr. - 100 ppm -150 ppm OSHA 15 min. - 150 ppm - 200 ppm
Asbestos	Insulation; ceiling and floor tiles;	OSHA 8 hr. - 0.1 fiber per cubic centimeter
Dusts	Various	OSHA 8 hr. - 10 milligrams per cubic meter
Carbon Dioxide	Bioeffluents; poor HVAC operation.	OSHA 8 hr. - 5,000 ppm OSHA 15 min. - 30,000 ppm

APPENDIX C



CALIFORNIA STATE
UNIVERSITY
E A S T B A Y

QUESTIONNAIRE Indoor Air Quality

Occupant Name: _____

Today's Date: _____

Building Name: _____

Room Number: _____

Time/Hours Worked Today: _____

Symptom Patterns

1. What kind of symptoms or discomfort are you experiencing?
2. Are you aware of other people with similar symptoms or concerns? Yes___ No___
3. Do you have any health conditions that may make you particularly susceptible to environmental problems?

Timing Patterns

1. When did your symptoms start?
2. When are they generally worst?
3. Do they go away? If so, when?
4. Have you noticed any other events (such as weather conditions, temperature or humidity changes, or activities in the building) that tend to occur around the same time as your symptoms?

Spatial Patterns

1. Where are you when you experience symptoms or discomfort?
2. Where do you spend most of your time in the building?

Additional Information

1. Do you have any observations about building conditions that might need attention or might help explain your symptoms?
2. Do you have any other comments?

